OUTLINE FOR A RCRA FACILITY INVESTIGATION (RFI) SCOPE-OF-WORK

1. Project Overview and Objectives

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This section essentially consists of information, not directives, given to the Contractor by the project team. Refer to the RI/FS outline for more information on these topics; however, specific guidance under RCRA is provided, where appropriate.
****

1.1 Site Description
- 1.1.1 Location and Site Conditions
- 1.1.2 Site Background
  - 1.1.2.1 Site Industrial Usage
  - 1.1.2.2 Disposal Practices

****
The project manager should discuss past disposal practices/releases at the site with the customer and then put this information into the scope.
****

1.1.2.3 Types of Wastes Disposed of/Released at the Site

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The project manager should discuss with the customer what types of hazardous wastes or hazardous constituents were disposed of at the site. If possible, the project manager should specify in the scope whether the wastes were listed, characteristic or hazardous constituents. An attempt should be made to identify the waste codes as per 40 CFR 261.
****

1.1.3 Regulatory Authorities and Enforcement History

****
In this section, the project manager should indicate which authority the RFI is proceeding under and whether or not the facility is on the NPL. This will serve several purposes. Everyone working on the project will understand which

corrective action process applies. The regulatory authorities will be clear. Reviewers will readily know the authorities and which corrective action is being undertaken.

RCRA 3004(u) requires that a facility seeking a permit undergo an investigation (RFA) to determine if there are any uncontrolled releases at the facility. Hence, typically the state or EPA will perform the RFA during the permitting process. It is very important for the project team to know whether the installation is seeking a Part B, Closure or Post-Closure Permit. Permitting is the most obvious way to determine if the RCRA Corrective Action process applies. If the facility is in the permitting process it is extremely important for the project team to know where in that process since the RFI is integrated through this permit process. The regulating agency will require that the installation perform a RFI on all SWMUs that have been identified during the RFA.

RCRA also provides for the state or EPA to issue an administrative order to the facility requiring the development of an RFI. The project team should know if this is the scenario you are working under.

Facilities that are non-NPL and require cleanup under the RCRA corrective action process will need to closely coordinate with the state since, in most instances, they are the regulatory authority.

For those sites that are on the NPL and subject to the RCRA corrective action provisions, it is necessary that the project team cease work at this point and ensure that some sort of ten-party agreement such as a Federal Facility Agreement Interagency Agreement, Consent Order,etc. has been developed to integrate the CERCLA and RCRA remediation process. If this is the case, EPA and the state will be heavily involved in the corrective action process. If this agreement is not yet available, discuss this matter with your customer.
****

1.1.4 Previous Studies and Results

1.2 Project Planning Overview and Objectives

****
While the RFI is quite similar in nature to a CERCLA RI, one major difference is that the RCRA enforcement authority is the lead agency and, as such, has control over what must be

included or what may not be included in the RFI. Unlike the CERCLA RI process, the contents of an RFI are up to the discretion of the RCRA enforcement agency. Hence, this outline may not be all inclusive, or on the other hand, this outline may be much, much more than what is required by the RCRA enforcement agency. Prior to scoping, it is essential that the project team understand the regulatory requirements, then seek to add elements to the scope on a case-by-case basis that would assist the Corps in further studies or designs at the site. The basic premise of the RFI is to further investigate the SWMUs identified in the RFA.
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1.2.1 Site Strategy Development
1.2.2 RFI Objectives and Project Decision Statements

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These are a series of statements indicating the specific goals of the RFI as developed by the team for the Contractor's information. In an RFI, the primary goal is to identify any Solid Waste Management Units (SWMUs) missed during the RFA, characterize the nature, extent, direction, rate, movement and concentration of releases from confirmed and newly identified SWMUs. (Confirmed through the RFA).

Determining project specific objectives is an interactive project team approach which will enable study to focus resources toward essential project requirements, and will enhance and accelerate the projected response action. Team members are discussed at length within the RI/FS SOW. Discussions include the development of project decision statements, data needs, and eventually the data collection program. Reference the RI/FS SOW outline for guidance on these subjects.
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1.2.3 Preliminary Corrective Measures Objectives

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This section should note for the Contractor the consideration given to development of corrective measures during the development of the scope requirements (particularly in the field investigations). Note that this process should also consider innovative technologies.
****

1.2.4 Data Quality Objectives
1.3 Summary of Required Tasks

****
This is only a superficial listing of tasks to be performed under this scope-of-work. No details are to be given here.

Task 1 Description of Current Conditions
Task 2 Pre-Investigation Evaluation of Corrective Measures Technologies
Task 3 RFI Planning Requirements
Task 4 Field Investigation
Task 5 Sample Analyses, Data Assessment and Reporting
Task 6 Data Evaluation/Fate and Transport Analyses
Task 7 Health and Environmental Assessment
Task 8 Identification and Development of Points of Compliance and Action Levels
Task 9 Evaluation of Action Levels/Criteria for Further Action, Development of Recommendations
Task 10 Reports

1.4 References

****
Include citations of previous reports, permits, enforcement actions, site inspections, guidance documents, RCRA documentation (such as manifests, biennial reports, annual reports, waste analysis records, land ban records, etc.), and any other documents. List only those documents that the team possesses or can locate. Indicate which documents are being provided to the Contractor.
****

2. Project Requirements

2.1 Task 1 Description of Current Conditions

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Generally, this topic requires the Contractor to investigate the facility background including location, property lines, topography, structure, past or active SWMUs, surrounding land use, location of all existing monitoring wells, maps, spill reports, past permits, past enforcement documentation, etc. The Contractor is also tasked to compile current knowledge of nature and extent of contamination, including reports of all possible sources of releases, locations of releases, quantities, type of waste (listed or characteristic hazardous

waste or hazardous constituents), monitoring data, potential pathway data, instances in which concentrations exceed action levels, potential impact, etc.
****

2.1.1 Background Data Collection

****
In this section, the project manager should require the Contractor to investigate and identify past disposal practices at each SWMU. Under RCRA, it is EXTREMELY important to determine what type of waste you are remediating. If this information is not known, the project manager should require that the Contractor investigate and identify if the waste at the SWMU is listed or characteristic hazardous waste, or contains hazardous constituents.
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2.1.1.1 Literature Searches

****
This would require the Contractor to review available information, include previous reports, published articles, maps, government records, site records, regulatory documents, etc., concerning the site(s). In the majority of cases, the RFI will be conducted during a RCRA permitting process. The project manager should require through the scope that the Contractor research the past regulatory atmosphere associated with these SWMUs. The Contractor should be required to look at past RCRA inspection reports, past RCRA documentation (such as annual reports, biennial reports, manifests, permits, enforcement orders, etc.), past reports, etc. From this information, the Contractor shall develop a feel for the regulatory enforcement strategy at the SWMUs.
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2.1.1.2 Interviews
2.1.1.3 Preliminary Site Boundaries Identification

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This section would require the Contractor to estimate site boundaries based on existing information. Under RCRA remediation, it is important to identify the physical extent of the contamination early in the process. While this probably cannot be done at this point, keep this requirement in mind.
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2.1.1.4 Municipal/Industrial/Domestic Well and Water Intake Survey
2.1.2 Preliminary Site Visit
2.1.3 Preparation of Draft Current Conditions Report (CCR)

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This section should require the Contractor to prepare the components of a current conditions report. This would be an optional submittal. The draft report could be part of the RFI report or separate early submittal. The final CCR would be a part of the RFI report. The necessary topics are outlined in the EPA RFI guidance. These include, but are not limited to, the following.
****

2.1.3.1 Local/Regional Summary
2.1.3.2 History and Extent of Problem
2.1.3.3 History of Regulatory and Response Actions
2.1.3.4 Review of the RFA
2.1.3.5 Site Boundaries Identification

2.2 Task 2 Pre-Investigation Evaluation of Corrective Measures Technologies

****
The Contractor should be tasked with recommending any implementation of interim measures, including the objectives of any interim measures, schedules, designs, etc. The use of innovative technology should be considered in accordance with directives from EPA and HQUSACE.

See Enclosure 11 to the ETL on Alternative Selection for additional information.
****

2.3 Task 3 RFI Planning Requirements
2.3.1 RFI Workplan
2.3.1.1 Identification/Refinement of DQOs

****
Contractor should be required to evaluate and expand on DQOs listed within the scope of services, as discussed in the RI/FS SOW.
****

2.3.1.2 Data Collection Program Design
2.3.1.3 Workplan RFI Report Requirements Discussion

****
This section would serve the same purpose as the same topic in the RI/FS outline. This section would direct the Contractor to describe the RFI report format and expected general content in the workplan. This section would also allow the USACE team to specify the requirements for the RFI report format and general content. If this information is proposed in the workplan, it allows the USACE team to comment on it before the Contractor actually prepares the RFI report. This should save time and effort later. Refer to the RI/FS outline for more information. Reference the discussion of the RFI report in section 2.10.
****

2.3.2 Preparation of Workplan Attachments

****
This section requires the Contractor to prepare the following plans in accordance with technical requirements given in Sections 4, 5, and 6. The language used here for preinvestigative plans is in accordance with USACE requirements and differs from RCRA guidance. The project team may investigate with the regulating office the option to use the language and plan approach outlined within the RFI guidance. Regardless of the language used in naming of the plans, the USACE guidance for the Chemical Data Acquisition Plan (CDAP) and the Monitoring Well Installation and Drilling Plan (MWIP) encompasses the requirements of the Data Collection Quality Assurance Plan and the Data Management Plan. The USACE requirements for the Site Safety and Health Plan (SSHP) encompass the requirements of the Health and Safety Plan. The Project Management Plan required under RCRA would be included in the topics covered in the main RFI Workplan.
****

2.3.2.1 Chemical Data Acquisition Plan (CDAP) Attachment
2.3.2.2 Monitoring Well Installation and Drilling Plan (MWIP) Attachment
2.3.2.3 Site Safety and Health Plan (SSHP) Attachment
2.3.2.4 Community Relations Plan Attachment
2.3.3 Community Relations Planning

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The project manager should contact the customer and the RCRA enforcement agency to determine specific requirements for community relations during each RFI. Note that the Community relations Plan is discussed in the previous section.
****

2.3.3.1 Establish Repository

****
Since most RFIs will be done in conjunction with the RCRA permitting process, the project manager should ask the customer to add all RFI related information to the existing repository.
****

2.3.3.2 Community Relations Support

2.4 Task 4 Field Investigation

****
This section describes the required quantities and the locations of the field activities. The variety of field investigations for an RFI is comparable to that for a remedial investigation; therefore, refer to text under Section 2.3, Field Investigations of the RI/FS scope-of-work outline for explanatory text for each of the topics listed below. NOTE: Only a subset of the activities listed below would typically be done. NOT ALL ACTIVITIES listed here are required at each site. The sections below are provided for completeness only, and should not be inferred to mean that all of these activities are to be done under the RFI for each project.

Based on the preliminary conceptual site model and project objectives, the sample design and analytical requirements are formalized within the scope of services as descriptive narratives. Reference the RI/FS SOW for guidance on this subject. This usually is presented in the Field Investigations portion of the scope. Rationale for sample design should include geostatistical analysis for sample design if appropriate, criteria for biased vs. random approach, and identification of critical samples. Rationale should extend to criteria for placement of the sampling point, depth of sample relevant to the intended use of the data, and criteria for level of uncertainty based on relevance, applicability, or usefulness to specific requirements.

Chemistry analytical requirements should be specified in Section 2.5, Sample Analyses, Data Assessment and Reporting for specific requirements such as selection of specific methods/quantification limits. Requirements in this section of the SOW generally should be cross referenced to the other sections relating to data quality objectives.
****

2.4.1 Site Topographic and Boundary Surveys
2.4.2 Geophysical Surveys
2.4.3 Soil Gas Sampling
2.4.4 Drum Sampling
2.4.5 Surface Soil Sampling
2.4.6 Surface Water/Lagoon Sampling
2.4.7 Leachate Sampling
2.4.8 Subsurface Soil Sampling
2.4.9 Fracture Trace Analyses
2.4.10 Monitoring Well Installation and Sampling
2.4.11 Air Sampling
2.4.12 Wipe Samples
2.4.13 Infiltration Testing
2.4.14 Vadose Zone Permeability Testing
2.4.15 Pump Tests
2.4.16 Tracer Tests

2.5 Task 5 Sample Analyses, Data Assessment and Reporting

****
The following sections should define the analytical and data assessment/validation protocols for the completion of the RFI. The project chemist should develop the chemistry related components of the project specific data quality objectives (DQOs) to provide sufficient data and quality in order to provide data which meets the requirements of the data users, and to determine the nature and extent of contamination at SWMU/CAMU identified through the RFA. In addition, the RFI should gather necessary data to support or deny potential treatment options to be assessed during the Corrective Measure Study (CMS).

Based on field investigations specified in Task 4, the following sections of this task will be developed by the chemist with collaboration with the data users. Analytical procedures will be specified for appropriate matrices to be collected in the field investigations.

Due to the comparability of the RFI under RCRA to the RI portion of the RI/FS under CERCLA, the chemist may reference the explanatory text in the RI/FS SOW outline for additional information on the following.
****

2.5.1 Data Review and Assessment
2.5.1.1 Existing Data
2.5.1.2 New Data

****
Based upon the data needs for the site-specific RFI which include defining the nature and extent of contamination at each site, potential migration pathways, and potential impact on human health and the environment, the chemist should specify the level of confidence required for each type of data acquired, based upon the data needs of the data users. Reference the explanatory text within the RI/FS SOW outline for specific information.
****

2.5.2 Analytical Procedures

****
The following sections of the SOW will outline specific analytical protocols to be followed on a site-specific basis for the entire RFI. The chemist should generate tables summarizing this information. Examples and suggested format for these tables is located within the Project Planning Guidance Document. Individual tables should be generated for each site with a multi-site RFI. The chemist must be intimately aware of the project background details and project specific DQOs to collaborate with the data users and other project team members in order to make decisions as to the most appropriate analytical protocol. This should include full knowledge of the previously completed data and areas where data gaps exist requiring further assessment. Reference the explanatory text within the RI/FS SOW outline for additional information over the following.
****

2.5.2.1 Field Screening
2.5.2.2 Water
2.5.2.2.1 Surface
2.5.2.2.2 Ground Water
2.5.2.3 Soils/Sediments/Sludges

****
The chemist and the project team members (data users) must consult to develop an appropriate analytical protocol. Background sample analysis is critical to every RFI, the chemist should make certain these samples are collected and analyzed on a SWMU-specific basis. In some instances, an installation-specific collection of background soil samples may be appropriate. Regulators must be consulted for each installation to determine the approach necessary. Reference the explanatory text within the RI/FS SOW outline for additional information.
****

2.5.2.4 Drum Samples
2.5.2.5 Wipe Samples
2.5.2.6 Air Samples
2.5.2.7 Soil Gas
2.5.2.8 Bench Scale Testing

****
The chemist should work jointly with a process engineer to develop specific DQOs for this section. The use of innovative technology should be considered in accordance with directives from EPA and HQUSACE when considering appropriate treatment options. The chemist will be required to define an appropriate analytical protocol for the assessment of these treatment options, and/or to define applicability of the waste to the treatment option.
****

2.5.3 Quality Assurance/Quality Control Samples
2.5.3.1 QA Laboratory
2.5.3.2 QC Samples
2.5.4 Laboratory Internal Quality Control
2.5.5 Method Detection Limits
2.5.6 Laboratory Turnaround Time
2.5.7 Sample Handling
2.5.8 Preservatives and Holding Times
2.5.9 Investigation-Derived Wastes

2.6 Task 6 Data Evaluation/Fate and Transport Analysis
2.6.1 Data Evaluation

****
The RI/FS outline contains more information related to this section.
****

2.6.1.1 Comparison to Data Quality Objectives - Establish Data Usability
2.6.1.2 Refinement of Site Conceptual Model

****
Refer to the RI/FS outline for explanatory text on this topic. Conceptual site model will be subsequently expanded further into the exposure assessment of the health assessment. The site conceptual model is to be documented in the RFI report, data evaluation section, and health assessment.
****

2.6.1.3 Nature and Extent of Contamination
2.6.1.4 Hydrogeology
2.6.2 Fate and Transport Analysis

****
Refer to the RI/FS outline for information on this topic.
****

2.6.2.1 Air Transport Analysis
2.6.2.2 Surface Water Transport
2.6.2.3 Ground Water Transport

2.7 Task 7 Health and Environmental Assessment

****
The RFI health assessment is somewhat structurally similar to the risk assessment requirements for the RI/FS. The following is an excerpt of the risk assessment instruction included in the RI/FS scope-of-work guidance, which should be used as a guideline in developing requirements for the RFI health assessment. Variations may be regarded in use of conclusions or recommendations of the health assessment, which do not require a numerical quantitative evaluation of risk to determine site action, but rather a comparative analysis of potential exposure point concentrations and/or intakes with proposed corrective action levels.

Project team and member responsible for risk assessment shall specify level of effort required for the risk assessment based on customer specific requirements and regulatory restraints. Generally, format and content should follow EPA's "Risk Assessment Guidance for Superfund, Volumes I & II", 1989.
****

2.7.1 Human Health Assessment

2.7.1.1 Identification of Chemicals of Concern

****

Data identified as required to support the health assessment in the DQOs for the project are evaluated in this section to determine if data collected was of sufficient quantity and quality as was specifically intended. If sampling design and analytical DQOs were formulated properly with the end use in mind; data to evaluate the nature and extent, which will support the fate and transport analysis and modeling, will be of sufficient quality and quantity to adequately evaluate exposure routes, exposure point concentrations, and to evaluate comparatively the potential risks associated with a specific site.

DQOS for sampling requirements to support the health assessment, take into account statistical representativeness, bounds of the data, toxicity reference concentrations in determining detection limits, spatial representativeness to properly evaluate exposure routes, and quality assurance/quality control, specific sampling and analytical requirements to assure data may be used for exposure point concentration quantification.

Selection of chemicals therefore, must evaluate data quality and quantity sufficient to support the health assessment, by evaluating data by originally intended DQOs for quality with respect to sample quantitation limits, qualifiers and codes, blanks, background samples, frequency of detection, and statistical representativeness. Contractor must then present data for chemicals selected as the range of concentrations detected, frequency of detection, and sample quantitation limits. DQOs for sample collection should take into account sufficient quantity of data is gathered to calculate a meaningful average concentration that populations may reasonably be expected to be exposed to over time. Data collected for modeling to calculate exposure point concentrations should also take into account sufficient data is collected such that the average value calculated represents a statistically meaningful value.

****

2.7.1.2 Exposure Assessment

****
The conceptual site model, preliminarily developed by the project planning team, and further refined by the Contractor in the workplan and data evaluation section of the RFI, is expanded further in this section as the basis for the exposure assessment. The source area, intermedia transport mechanisms, exposure routes, and populations are evaluated in this section to define exposure pathways develop potential exposure point concentrations. Contractor should identify and discuss all relevant exposure pathways, surface water transport, air dispersion, ground water transport developed in the fate and transport section, to calculate exposure point concentrations for current and potential future exposures to identified receptors.

Populations initially identified in the conceptual site model should be evaluated in more detail, as to those populations which may reasonably be expected to potentially come into contact with site wastes, by the identified exposure routes, both currently and in the future. Generally, "worst case" assessments should be avoided as unrealistic. Receptors should be identified with full consideration given to all potential limiting factors; institutional controls, engineering controls, transient nature of occupancy, zoning, and any reasonable expectations of maintaining or establishing ecological sanctuaries or protected areas (which will be used in the environmental evaluation), in identifying realistic potential exposure scenarios for humans. It is important that a balance be maintained in identifying receptors and potential exposure scenarios between attempting to identify all potential risks to human health, and factors that may realistically prevent those exposures.

All calculations used in the assessment should be documented within the text as well as all references used in the analysis.
****

2.7.1.3 Toxicity Assessment

****
The toxicity assessment is a descriptive section that summarizes applicable available toxicity information for identified chemicals of concern.

The descriptive sections or toxicity profiles should minimally include a summary of study used to derive RFDs and

slope factors, confidence, weight of evidence, and indicated effect, and criteria for selecting specific values for the exposure durations indicated for the risk assessment, such as acute exposures, chronic exposures, and subchronic exposures developmental effects for non-carcinogens, and chronic exposures only for carcinogenic effects.

The summaries of the toxicity assessments should be within the body of the health assessment, with any accompanying full text included in an appendix to the health assessment or RFI.
****

2.7.1.4 Risk Characterization

****
In this section, the Contractor should be required to compare exposure concentrations with proposed corrective action limits as a basis of determining relative potential for identified populations for adverse health effects or risks. Contractor should clearly identify, in a tabular format, this comparison associated with each chemical for each route of exposure.

Contractor will be expected to discuss results within the body of the text, including uncertainties and limiting factors associated with qualitation, and provide a summary of all results.

Those concentrations for specific identified receptors which are above the specified level for a media of concern, shall be used as the basis for correction action objectives. Either of these preliminary objectives shall be included in the summary of the risk assessment and will be forwarded to the corrective action study to establish corrective action goals. Additionally, the summary and conclusions of the health assessment shall be forwarded for qualitative analysis of risk associated with each alternative as compared to the "no action" or baseline alternative, in the corrective action study.
****

2.7.1.5 Uncertainty Analysis

****
An essential part of the risk assessment process is the uncertainty analysis. Numerical and non-numerical evaluations of errors and uncertainties associated with

sampling design and analysis, fate and transport, intake assessment, toxicity assessment, and risk characterization should be discussed so that customer has an indication of limitations of the results or risks calculated in making an informed decision regarding remediation. Each section of the risk assessment should include a full uncertainty analysis, which may be qualitative, but is in some cases more useful from a quantitative perspective. Evaluation should include degree of false positives expected, and false negatives, and in what manner errors may affect overall decision making and site management. DQOs originally determined should take into account acceptable error expected in the health assessment based on quality and quantity of data collected, and should be referenced in this analysis.
****

2.7.2 Environmental Evaluation

****
The environmental evaluation is less straightforward than the human health evaluation. It may be complicated by competing exposure pathway analysis for human receptors in defining potential environmental populations, and overall in determining remedial action objectives. Although not necessarily stated, neither assessment takes precedence over the other in weighing corrective action requirements. The requirement for performing the environmental evaluation finds its authority in CERCLA Section 121; however, the requirement is intended to respond to other applicable statutes including Endangered Species Act, Wild and Scenic Rivers Act, Marine Protection, Research and Sanctuaries Action, Fish and Wildlife Conservation Act, Migratory Bird Treaty Act, the Marine Mammal Protection Act, as well as state and local laws.

Some elements of the human health risk assessment are similar to the environmental evaluation in regards to selection of chemicals of concern, exposure assessment, toxicity assessment, and risk characterization; however, the information and criteria for each step in the evaluation are usually separate from the human health evaluation and original to the environmental evaluation. DQOs proposed to support the environmental assessment for sample design and analysis, may have some overlap with the human health assessment, but for the most part are unique statements.
****

2.7.2.1 Identification of Chemicals of Concern

****

DQOs developed specifically for the environmental evaluation, using the preliminary conceptual site model for environmental receptors as a guideline are restated in this section to evaluate quality and applicability of data collected to originally intended purposes.

The environmental evaluation may require unique analytical methods, such as metal speciation, dissolved and total metals, and biological and chemical oxygen demand, and unique sampling designs to properly evaluate potential exposures. Depending on site-specific regulatory requirements and customer requirements, the degree of testing may be limited to chemical testing or may involve site-specific toxicity testing. Regulatory authorities responsible for determining planning and preservation of ecological environments should be consulted to determine critical information regarding current future use of the areas and other specific concerns so that DQOs and conceptual site model may be focused for actual intended uses.

In this section, Contractor will be required to evaluate data collected for quality and usability with regard to DQOs originally formulated. Included would be evaluation of detection limits with toxicity reference concentrations, data quality indicators, and statistical representativeness. Contractor shall include acceptable data collected in tabular format indicating range of concentrations, frequency of detection and detection limits of the analytical methods. Additionally, Contractor will be required to determine the 95th percent upper confidence on the arithmetic average using standard statistical methods, if possible. DQOs for sample collection should take into account sufficient quantity of data is gathered to calculate a meaningful average concentration that populations may reasonably be expected to be exposed to over time. Data collected for modeling to calculate exposure point concentrations should also take into account sufficient data is collected such that the average value calculated represents a statistically meaningful value.

****

2.7.2.2 Exposure Assessment

****

The conceptual site model, preliminarily developed by the project planning team, and further refined by the Contractor in the workplan and data evaluation section of the RFI, is expanded further in this section as the basis for the exposure assessment. The source area, intermedia transport mechanisms, exposure routes, and populations are evaluated in this section to define exposure pathways develop potential receptor exposure point concentrations. Contractor should identify and discuss all relevant exposure pathways, surface water transport, air dispersion, ground water transport developed in the fate and transport section, to calculate exposure point concentrations for current and potential future exposures to identified receptors.

Populations initially identified in the conceptual site model should be evaluated in more detail, as to those populations which may reasonably be expected to potentially come into contact with site wastes, by the identified exposure routes, both currently and in the future. Include any identified critical habitats, threatened or endangered species in the evaluation. The most important factor in developing a valid environmental evaluation is properly determining potentially exposed populations. Project planning team should consult U.S. Fish and Wildlife, state and local resource coordinators and the National Oceanic and Atmospheric Administration to aid in determining potentially exposed environmental populations, for the preliminary conceptual site model development and DQOs. Additionally, project planning team should be sensitive to any potential overlaps in identifying receptor populations for human health and environmental populations for current and future use. It is recommended that a representative population should be chosen from the various species identified to evaluate the overall impacts for the community of plants and/or animals that could be exposed.

The combined human health and environmental assessments should be a cohesive interpretation of potential future use conditions in determining potential impacts to human health and the environment, rather than separate and detached. Conclusions of both assessments will have a direct bearing on corrective action goals and therefore, remediation requirements.

All calculations used in the assessment should be documented within the text as well as all references used in the analysis.
****

2.7.2.3 Toxicity Assessment

****
The toxicity assessment is a descriptive section that summarizes applicable available toxicity information for identified chemicals of concern. It is recommended that Contractor use information available from EPA specific toxicity studies performed for specific chemicals of concern, and information provided by regional EPA environmental assessment groups.

The descriptive sections or toxicity profiles should minimally include a summary of study used to toxicity values, indicated effect, and criteria for selecting specific values for the exposure durations indicated for the risk assessment, such as acute exposures, chronic exposures, and subchronic exposures developmental effects for non-carcinogens, and chronic exposures only for carcinogenic effects.

The summaries of the toxicity assessments should be within the body of the risk assessment, with any accompanying full text included in an appendix to the health assessment or RFI.
****

2.7.2.4 Qualitative Risk Assessment

****
A narrative discussing comparatively potential adverse health effects expected based on potential exposure point concentrations as compared to toxicity values should be included in this section.

Minimally, tabular format comparing toxicity information with expected exposure point concentrations and an explanatory analysis should be sufficient.
****

2.7.2.5 Uncertainty Analysis

****
Numerical and non-numerical evaluations of errors and uncertainties associated with sampling design and analysis,

fate and transport, intake assessment, toxicity assessment, and risk characterization should be discussed so that customer has an indication of limitations of the results or risks calculated in making an informed decision regarding remediation. Each section of the risk assessment should include a full uncertainty analysis, which may be qualitative, but is in some cases more useful from a quantitative perspective. Evaluation should include degree of false positives expected, and false negatives, and in what manner errors may affect overall decision making and site management. DQOs originally determined should take into account acceptable error expected in the risk assessment based on quality and quantity of data collected, and should be referenced in this analysis.
****

2.8 Task 8 Identification and Development of Points of Compliance and Action Levels

2.8.1 Identify Point of Compliance

****
This section requires the Contractor to identify the point of compliance. The point of compliance is a very important concept in remediating under RCRA. Guidance can be found in the Federal Register of 27 July 1990, pages 30830 - 30832. The project manager should require in the scope that the Contractor identify points of compliance that will serve to benefit the remediation. After the points are proposed, the project manager will have to send the proposed points to the RCRA authorities for approval.
****

2.8.2 Identification of Action Levels (ALs)

****
The Contractor should be tasked under this section to identify the action levels identified in the permit or by the EPA post the RFA for eventual comparison to the contaminant concentrations found at the SWMUs under investigation. Reference section 2.8.2 of the RFA SOW outline for additional explanatory text on this matter. Remember: The action levels are the limits set by the state or EPA during the permitting process. Once the owner/operator of the SWMU has a release over the action level, RCRA corrective action requirements are triggered and corrective action must be initiated. What actually must be done will be at the discretion of the RCRA authorities.
****

2.8.2.1 Soil
2.8.2.2 Ground Water
2.8.2.3 Surface Water
2.8.2.4 Air

2.9 Task 9 Evaluation of ALs and Criteria for Further Action and Development of Recommendations

****
This section would require the Contractor to evaluate the site information developed to date against the ALs in order to determine the need for further action, or the development of recommendations for further actions. Refer to Section 2.8 of this outline.
****

2.10 Task 10 Reports

****
Provide details on content and format of RFI report here. Refer to RFI guidance.
****

2.10.1 Pre-Draft Data Package

****
Reference Section 2.7 of the RI/FS SOW outline for specifics on this submittal.
****

2.10.2 Draft RFI
2.10.3 Final RFI

3. Project Management

****
For explanatory text on these topics, refer to Section 3 of the RI/FS scope outline. Any aspects unique to the RFI or RCRA process are noted here.
****

3.1 Project Manager
3.2 Coordination with Other Entities
3.3 Conference Notes
3.4 Confirmation Notices
3.5 Government Support
3.5.1 Government Provided Data and Information
3.5.2 Existing Plans/Surveys/Air Photos

3.5.3 Utilities
3.5.4 Permits

****
Since this work is being conducted under RCRA, all administrative and substantial permitting requirements are applicable.
****

3.5.5 Rights of Entry
3.5.6 Security
3.5.7 Equipment Storage/Staging Areas
3.5.8 Temporary Office
3.5.9 Grading and Site Restoration
3.5.10 Investigation-Derived Waste Disposal
3.5.11 Wetlands Determination
3.6 Travel and Meetings
3.6.1 Preliminary Site Visit
3.6.2 Workplan Review Meeting
3.6.3 Field Work Start-up Meeting
3.6.4 Draft RFI Report Review Meeting
3.6.5 Final RFI Report Review Meeting
3.6.6 Public Meetings

****
All public meetings should be tied to the permit public meetings unless otherwise requested by the customer or specified by the regulatory agency.
****

3.6.7 Progress Meetings
3.6.8 Additional Trips
3.6.9 Site Visits
3.7 Schedules
3.8 Submittals

****
This section summarizes the submittals expected during the course of the project. No technical requirements are presented here. Numbers of copies required are specified here.
****

3.8.1 General Submittal Requirements
3.8.2 Document Submittal Register
3.8.3 RFI Workplan
3.8.4 Workplan Attachments

3.8.4.2 Chemical Data Acquisition Plan Attachment
3.8.4.3 Monitoring Well Installation and Drilling Plan Attachment
3.8.4.4 Site Safety/Health Plan Attachment
3.8.4.5 Community Relations Plan Attachment

****
The language used here for pre-investigative plans is in accordance with USACE guidance. The project team may investigate with the regulating office requirements to use the language and plan approach outlined within the RFI guidance. Regardless of the language used in naming of the plans, the USACE guidance for the Chemical Data Acquisition Plan (CDAP) and the Monitoring Well Installation and Drilling Plan (MWIP) encompasses the requirements of the Data Collection Quality Assurance Plan and the Data Management Plan.
****

3.8.5 Progress Reports
3.8.6 Monthly Progress Reports
3.8.7 Drilling Logs
3.8.8 Monitoring Well Construction/Development Record
3.8.9 Survey Documents
3.8.10 Draft Current Conditions Report
3.8.11 Pre-Draft Data Package
3.8.12 Draft RFI
3.8.13 Final RFI
3.8.14 QC Summary Report

4. NEPA Compliance During RFI

****
In general, it is recommended that a programmatic EIS be prepared during the onset of the RCRA corrective action process, if not, the NEPA requirements will have to be integrated into this process.

The project manager should consult a NEPA expert and office of counsel to develop scoping requirements.

See RFA scope outline for more information on NEPA compliance.
****

5. Health and Safety Technical Requirements

****
This section presents the technical requirements for health and safety. Refer to Enclosure 8 to the ETL for the suggested language for this SOW section.

Two topics, "Site Description and Contamination Characterization" and "Staff Organization, Qualifications, and Responsibilities" may be addressed as a portion of the workplan as outlined in section 2.1. In the event this material is addressed within the workplan (WP), the applicable WP sections should be referenced within these sections of the SSHP. Regardless of location, these topics should address the requirements contained in Enclosure 8.
****

6. Chemistry Technical Requirements

****
This section presents the technical requirements for performance of sampling and analysis activities. Specific requirements are discussed under the individual topics. Additional guidance on the typical content of this section is provided as Enclosure 13 to the ETL, Chemistry Technical Requirements. An outline of the section is provided here.
****

- 6.1 Introduction
  - 6.1.1 CDAP Format and Implementation Requirements
    - 6.1.1.1 Section 1. Table of Contents
    - 6.1.1.2 Section 2. Project Background Data
    - 6.1.1.3 Section 3. Chemical Requirements to Support Project Data Quality Objectives (DQOs)
    - 6.1.1.4 Section 4. Contractor Project Organization and Functional Areas of Chemistry Responsibilities
    - 6.1.1.5 Section 5. Field Activities:
      - 6.1.1.5.1 Field Instrumentation and Equipment (Calibration and Maintenance)
      - 6.1.1.5.2 Field Documentation
      - 6.1.1.5.3 Daily Quality Control Report (DQCR)
      - 6.1.1.5.4 QC and QA Field Samples
      - 6.1.1.5.5 Decontamination Procedures
      - 6.1.1.5.6 Matrix: Ground Water Samples
        - 6.1.1.5.6.1 Field Screening
        - 6.1.1.5.6.2 Locations

6.1.1.5.12.1 Field Screening
6.1.1.5.12.2 Locations
6.1.1.5.12.3 Sampling Procedure
6.1.1.5.12.4 Analytical Procedure
6.1.1.5.12.5 Sample Containers, Preservations, Holding Times
6.1.1.5.13 Matrix: Soil Gas Samples
6.1.1.5.13.1 Field Screening
6.1.1.5.13.2 Locations
6.1.1.5.13.3 Sampling Procedure
6.1.1.5.13.4 Analytical Procedure
6.1.1.5.13.5 Sample Containers, Preservations, Holding Times
6.1.1.5.14 Matrix: Drum / TankSamples
6.1.1.5.14.1 Field Screening
6.1.1.5.14.2 Locations
6.1.1.5.14.3 Sampling Procedure
6.1.1.5.14.4 Analytical Procedure
6.1.1.5.14.5 Sample Containers, Preservations, Holding Times
6.1.1.6 Section 6. Sample Chain of Custody, Packing and Shipping
6.1.1.7 Section 7. Laboratory Activities:
6.1.1.7.1 Cooler Receipt Form
6.1.1.7.2 Instrument Calibration and Frequency
6.1.1.7.3 Quality Control Procedures
6.1.1.7.4 Preventive Maintenance
6.1.1.7.5 Corrective Action
6.1.1.7.6 Data Reduction, Assessment / Validation, and Documentation
6.1.1.8 Section 8. Chemical Data Quality Management Deliverables
6.1.1.8.1 Daily Quality Control Reports
6.1.1.8.2 Laboratory Daily Quality Control Reports
6.1.1.8.3 Non-Routine Occurrences Reports
6.1.1.8.4 Pre-Draft Data Package
6.1.1.8.4.1 Pre-Draft Data Package Organization
6.1.1.8.4.2 Minimum Data Reporting Requirements for Pre-Draft Data Package

6.1.1.8.5 Quality Control Summary Report
6.1.1.8.6 Chemical Quality Assurance Report
6.1.2 Contractor Laboratory Approval
6.1.2.1 Commercial Laboratory Evaluation
6.1.2.2 Laboratory Quality Management Manual
6.1.2.3 Preliminary Questionnaire
6.1.2.4 Performance Evaluation Samples
6.1.2.5 Laboratory Inspection
6.1.2.6 Approval
6.1.2.7 Expiration of Validation
6.2 Miscellaneous Requirements
6.2.1 Investigation Derived Wastes

7. Geotechnical Requirements

****
The variety of field investigations for an RFI is comparable to that for a remedial investigation; therefore, refer to text in the Geotechnical Requirements Section (6.) of the RI/FS scope-of-work outline for typical requirements and other explanatory information on the topics outlined below.
****

7.1 General Specifications
7.1.1 Qualified Geologist/Geotechnical Engineer
7.1.2 Applicable Driller Permits and Licenses
7.1.3 Compliance with State Requirements
7.1.4 Utility Clearances
7.1.5 Disposal of Investigation-Derived Waste (IDW)

****
A note concerning the disposal of investigation-derived waste unique to RCRA. Since the sites to be studied are covered under the auspices of RCRA, all waste generated during investigations must be handled as a RCRA solid or hazardous waste. When waste is generated, the generator (for example, the driller) is responsible for determining if the waste is by definition hazardous. If the waste is hazardous, it cannot be placed onto the ground unless it is placed within a designated CAMU. If the waste is placed outside of the CAMU, this is illegal disposal and a violation of the land disposal restrictions. (For guidance see Federal Register, 27 July 1990, pages 30842 and 30843.) Hazardous waste may be moved or consolidated within a CAMU only. The project manager

must require that the Contractor dispose of IDW within a CAMU or off-site at a permitted treatment, storage or disposal facility (TSDF).
****

7.1.6 Explosive Ordnance Disposal
7.1.7 Decontamination of Equipment/Tools
7.1.8 Water Source and Testing
7.1.9 Site Restoration and Protection
7.1.10 Contractor Responsibility for Wells
7.1.11 Site Surveying
7.2 Monitoring Well Installation and Drilling Plan (MWIP)
7.3 Subsurface Soil/Rock Sampling
7.3.1 Drilling Method
7.3.2 Test Pit Excavation
7.3.3 Logging Requirements
7.3.4 Geotechnical Sampling and Analyses
7.3.5 Coring/Core Handling
7.3.6 Backfilling
7.3.7 Sampling Techniques
7.3.8 Field Screening
7.3.9 Location/Elevation Survey of Boreholes/Test Pits
7.4 Monitoring Well Installation
7.4.1 Drilling Method
7.4.2 Soil/Rock Sampling While Drilling
7.4.3 Field Screening
7.4.4 Casing and Screen
7.4.5 Gravel/Sand Pack
7.4.6 Grouting
7.4.7 Surface Completion
7.4.8 Well Development
7.4.9 Monitoring Well Construction Diagrams
7.4.10 Survey
7.4.11 In-Situ Permeability (Single Well) Testing
7.4.12 Water Level Measurements
7.4.13 Dedicated Pumps and/or Bailers
7.4.14 Well Sampling
7.5 Existing Domestic/Industrial/Municipal Well Inventory
7.6 Aquifer Tests
7.6.1 Pump Test Plan
7.6.2 Pumping Well Installation
7.6.2.1 Drilling Method
7.6.2.2 Soil Sampling While Drilling
7.6.2.3 Field Screening
7.6.2.4 Casing and Screen

7.10.2 Ground Truth/Verification
7.10.3 FTA Report
7.11 Miscellaneous Methodologies
7.11.1 Soil Gas Survey Methodology
7.11.1.1 Probe Design and Placement
7.11.1.2 Probe Purging
7.11.1.3 Sample Recovery
7.11.1.4 Decontamination of Equipment
7.11.1.5 Blank, Background, and Duplicate Samples
7.11.2 Tracer Studies
7.12 Geographic Information Systems (GIS)

8. Air

****
This section presents the technical requirements for performance of activities associated with air impact assessments. Enclosure 16 presents a general description of air impact assessments for those not familiar with the process.

Explanatory text is included in the RI/FS outline. The scope of activities performed in the RFI is comparable to the RI. Some of the topics below may not be appropriate for the RFI but are included for completeness. For example, measurement and estimate of emissions from remedial alternatives might be included in the CMS instead of the RFI. The level of detail to be included in the scope depends on the project and the Contractor's experience in performing air monitoring and modeling as well as the Contractor's experience in working with the Corps.
****

8.1 Ambient Air Monitoring/Sampling
8.2 Meteorological Monitoring
8.2.1 Review Available Data
8.2.2 On-site Monitoring
8.2.2.1 Meteorological Tower
8.2.2.2 Data to be Collected
8.2.2.3 Data Processing, Documentation and Reporting
8.3 Emission Rate Measurements
8.4 Emission Rate Estimates
8.4.1 Uncontrolled Emission Sources
8.4.2 Remedial Action Sources
8.4.3 Emission Models
8.4.4 Emission Factors
8.5 Atmospheric Dispersion Modeling
8.5.1 Purpose and Rationale